Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of Petition of WorldCom, Inc. Pursuant To Section 252 (e)(5) of the Communications Act for Expedited Preemption of the Jurisdiction of the Virginia State Corporation Commission Regarding Interconnection Disputes With Verizon Virginia, Inc., and for Expedited Arbitration	)	CC Docket No. 00-218
In the Matter of Petition of Cox Virginia Telecom, Inc. Pursuant to Section 252 (e)(5) of the Communications Act for Preemption Of the Jurisdiction of the Virginia State Corporation Commission Regarding Interconnection Disputes with Verizon Virginia, Inc. and for Arbitration	)	CC Docket No. 00-249
In the Matter of Petition of AT&T Communications Virginia Inc., Pursuant to Section 252 (e)(5) of the Communications Act for Preemption of the Jurisdiction of the Virginia Corporate Commission Regarding Interconnection Disputes with Verizon Virginia, Inc.	)	CC Docket No. 00-251

SURREBUTTAL TESTIMONY OF JOSEPH P. RIOLO

ON BEHALF OF AT&T AND WORLDCOM, INC.

SEPTEMBER 21, 2001

PUBLIC VERSION

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I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Joseph P. Riolo. I am an independent Telecommunications Consultant. My business address is 102 Roosevelt Drive, East Norwich, New York 11732.

Q. HAVE YOU PREVIOUSLY FILED TESTIMONY IN THIS PROCEEDING?

A. Yes, I filed Direct Testimony in this proceeding on July 31, 2001, Rebuttal Testimony of Recurring Cost Panel on August 27, 2001, and Panel Reply Testimony on Non-Recurring Costs and Advanced Data Services on August 27, 2001.

II. PURPOSE AND SUMMARY OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY?

A. I have been asked by AT&T and WorldCOM, Inc. to review and respond to certain issues raised by Verizon's witnesses Francis J. Murphy and Timothy J. Tardiff in their rebuttal testimony regarding the Synthesis Model in this proceeding.

Q. WOULD YOU SUMMARIZE YOUR TESTIMONY?

A. In Part III, I will explain why Verizon's criticisms regarding the Synthesis Model Platform are meritless. In Part III (A), I will show that Verizon's arguments regarding the purported failure of the Synthesis Model to adhere to Carrier Serving Area ("CSA") loop design standards are nothing more than a rehash of arguments that the Commission has already rejected. In Part III (B), I will discuss why Verizon's analysis regarding the failure of the Synthesis Model to comply strictly with Distribution Area ("DA") sizing guidelines is demonstrably unsound. In that connection, I will discuss the genesis of DA guidelines and explain why it is entirely appropriate to size a DA in excess of the limitations set forth in the DA sizing guidelines. In Part III (C), I will discuss why Verizon's analysis regarding the proper allocation of common equipment costs for a 4-

wire loop is flawed; and in Part III (D), I will explain why AT&T/WorldCom are absolutely correct in contending that network operations expenses in a TELRIC environment should be substantially lower than current levels. In Part IV, I will explain why Verizon's criticisms of my Digital Loop Carrier ("DLC") hardware inputs and structure-sharing recommendations are without merit. In that same section, I will explain that Verizon's analysis of the road distance factor is plainly erroneous. And finally in Part V, I will demonstrate that Verizon's criticisms regarding the Synthesis Model's fill factors simply cannot withstand scrutiny.

III. VERIZON'S CRITICISMS REGARDING THE SYNTHESIS MODEL PLATFORM ARE WITHOUT MERIT.

A. Loop Design, Engineering and Quality of Service Issues.

Q. VERIZON CONTENDS THAT THE SYNTHESIS MODEL DOES NOT ADHERE TO CSA LOOP DESIGN STANDARDS AND THUS CANNOT SUPPORT CERTAIN DIGITAL SERVICES. DO YOU AGREE?

A. No. Verizon's argument regarding CSA loop design standards involves two issues. First, Verizon asserts that CSA loop design standards "limit the use of copper loops to 12,000 feet beyond the feeder/distribution interface."[1] Stated differently, Verizon contends that the Commission should use a maximum copper loop length of 12,000 feet, rather than the maximum copper loop length of 18,000 feet in the Synthesis Model. Second, Verizon contends that the Synthesis Model will not support "services currently offered over basic loops (*i.e.*, a modem speed greater than 28.8 Kb/s, ISDN, DDS)."[2] Verizon is wrong on both counts.

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[1] Murphy Rebuttal Testimony at 19.

[2] *Id.*

Q. WHAT IS THE BASIS FOR YOUR ASSERTION THAT VERIZON'S ANALYSIS REGARDING MAXIMUM COPPER LOOP LENGTH IS FLAWED?

A. Verizon's argument regarding maximum copper length design is merely a rehash of arguments that the FCC has previously rejected. Although Verizon suggests that the maximum copper loop length of 18,000 feet in the Synthesis Model causes the Synthesis Model to design outside plant that cannot support certain digital services, the Commission specifically found in its *Platform Order* that copper loops that are 18,000 feet in length are suitable for the provision of services that meet quality standards for universal service.[3] Equally infirm is Verizon's assertion that CSA loop design standards strictly limit the use of copper loops to 12,000 feet.[4] Verizon blithely ignores that CSA standards also support the use of copper loops in excess of 12,000 feet in more rural areas.[5] In all events, as Mr. Pitkin explains in his Surrebuttal Testimony, even assuming *arguendo* that Verizon's concerns regarding the maximum loop length used in the Synthesis Model are somehow valid — and they are not — less than one percent of the loops constructed by the Synthesis Model exceed 12,000 feet.

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[3] *See In the Matter of Federal-State Joint Board on Universal Service, Fifth Report and Order*, 13 FCC Rcd. 21323, 21352 ¶ 70 (1998) (stating that "[w]e conclude that the federal mechanism should assume a maximum copper loop length of 18,000 feet" and that "the BCPM sponsors have not presented credible evidence that the 18,000 feet limit will not provide service at an appropriate level absent the use of expensive DLC line cards").

[4] *Id.*

[5] *See* Outside Plant Engineering Reference Manual, Bell Atlantic (Mar. 11, 1991) at 6 (stating that "[a]n Expanded Carrier Service Area is a combination of CSAs, in rural areas, where distribution cable length can be as long as 23,000 feet").

Q. CAN COPPER LOOPS UP TO 18,000 FEET SUPPORT MODEM SPEEDS GREATER THAN 28.8KB/S?

A. Yes. Copper loops of up to 18,000 feet as designed by the Synthesis Model will definitely support analog modem speeds greater than 28.8Kb/s. Services provided at modem speeds in excess of 28.8Kb/s can be adversely affected by "lumped" impedance caused by load coils and bridged tap; however, the copper loops constructed by the Synthesis Model do not suffer from any such impedence. The Synthesis Model models copper analog cable in the loop, but digital transmission everywhere else (*i.e.* Digital Switch, Integrated GR303 NGDLC, SONET IOF, fiber DLC). Moreover, the copper loops in the Synthesis Model are neither loaded nor bridge-tapped. As a result, the copper loops in the Synthesis Model will support modem speeds greater than 28.8Kb/s.

Q. CAN COPPER LOOPS UP TO 18,000 FEET SUPPORT ISDN?

A. Yes. Not only can ISDN work on copper loops of up to 18,000 feet, but ISDN can also operate over even longer copper loops. Thus, for example, Bellcore's transmission engineering guidelines state that "[t]he standard DSL for ISDN basic-rate access . . . is intended for use on ordinary non-loaded loops up to 18,000 feet in length."[6] In addition, a document published by NYNEX, a pre-merger affiliate of Verizon, reveals that ISDN can operate over copper loops that well exceed 18,000 feet. In this regard, a NYNEX customer brochure[7] states that, "NYNEX is working to overcome the technical restriction that limits ISDN connectivity to a distance of about 18,000 feet (slightly less than three and a half miles) from the user's local telephone switch. Using line boosters, that

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[6] Bellcore, "Telecommunications Transmission Engineering," vol. 3 (1990) at 112.

[7] NYNEX, "NYNEX ISDN" at 65.

distance can be effectively doubled." *Id.* Thus, this NYNEX brochure confirms that ISDN can operate over copper loops of approximately 36,000 feet in length.

Q. CAN COPPER LOOPS UP TO 18,000 FEET SUPPORT DDS?

A. Yes. Older, less sophisticated DDS data sets were typically designed for 31db loop loss including margin. All of these services (2.4Kb/s, 4.8Kb/s, 9.6Kb/s, 19.2Kb/s and 56Kb/s) are capable of operating satisfactorily over loop lengths developed within the Synthesis Model. Additionally, the multipurpose channel unit (U4W2) that provides 4 wire voice or data service from a Litespan DLC remote terminal can operate with 18Kft of non-loaded copper cable.

B. Customer Location Issues.

Q. VERIZON CLAIMS THAT THE SYNTHESIS MODEL'S FAILURE TO ADHERE TO DA SIZING GUIDELINES RESULTS IN INEFFICIENT AND INAPPROPRIATE OSP DESIGN. DO YOU AGREE?

A. No. Verizon's claims that DA guidelines limit the DA to 200 to 600 living units,[8] and that DAs were so sized to maximize feeder cable and minimize distribution cable. Verizon then concludes that the Synthesis Model produces an inefficient OSP design since it models a network that includes DAs exceeding 600 living units.[9] Verizon's arguments are demonstrably unsound and reflect a fundamental lack of understanding regarding the genesis of DA sizing guidelines.

I was one of the original members of a Bell System task force that developed the formal process for Long Range Outside Plant Planning. The Bell System task force

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[8] Murphy Rebuttal Testimony at 28.

[9] *Id.*

recognized that it is unduly burdensome and cumbersome to develop an outside plant plan based upon an analysis of the entire outside plant that can consist of thousands of circuits. As a consequence, the Bell System task force determined that the outside plant planning process could be facilitated by dividing the outside plant into discrete administrative units that can be analyzed separately. Thus, the Bell System task force divided each Wire Center Area into Feeder Route Areas, which were, in turn, subdivided into Allocation Areas that may be sized from 500 to 2,000 assigned lines. Allocation Areas were subdivided into Distribution Areas (generally sized at 200 to 600 ultimate dwelling units). Although Verizon contends that the Distribution Area was sized at 200 to 600 living units in order to maximize feeder cable and minimize distribution cable, Verizon is simply wrong. The Distribution Area was neither developed nor sized to maximize feeder cable and minimize distribution cable. The members of the Bell System task force developed and sized Distribution Areas merely as an administrative convenience to facilitate an examination of outside plant.

Q. VERIZON SUGGESTS THAT ENGINEERING GUIDELINES REQUIRE ENGINEERS TO LIMIT THE SIZE OF THE DISTRIBUTION AREA TO 200 TO 600 LIVING UNITS. DO YOU AGREE?

A. No. Although Verizon suggests that engineering guidelines absolutely require that engineers limit the size of the Distribution Area to 200 to 600 living units, the reality is that engineering guidelines are rather flexible. For example, a resort area bounded by a lake, mountain and highway can be treated as a DA even though the DA contains substantially fewer than 200 living units. In fact, engineering guidelines recognize that a

DA can properly include fewer than 200 living units.[10] Similarly, DAs may properly consist of more than 600 living units. For example, cluster housing that concentrates more than 600 living units in a lakefront community may be treated as a single DA if it is served from one interface (SAI), has one documented design point,[11] and meets transmission requirements for usage and loss.

It must also be emphasized that the original DA sizing guidelines were first developed back in the 1970's. Under engineering standards, a single DA must be served by one SAI. When the DA sizing guidelines were initially developed, the largest SAI at that time was limited to 1,800 terminations. Because SAIs were so limited, the sizing of DAs in the 1970's was also constrained. For example, if the cable sizing for an area warranted 2 pairs per living unit for distribution cable and 1.5 pairs per living unit for feeder, the largest DA served by a 1800 pair SAI would be approximately 500 living units.[12] However, since the advent of the DA guidelines, SAIs have substantially increased in size. Today 5,400 pair and 7,200 pair SAIs are readily available. Because SAIs today are substantially larger than they were in the 1970's, the SAIs can easily support a DA that is substantially larger than 600 living units. Accordingly, where circumstances dictate, DAs exceeding 600 living units are planned and constructed. In fact, as a result of my prior responsibilities at NYNEX, I became aware of any number of locations that had DAs that well exceeded 600 living units.

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[10] *See* Detailed Distribution Area Planning (DDAP), BSP901-350-250, Issue 1 (Dec. 1980) (recognizing that "it may be necessary to violate the minimum unit criteria if boundaries cannot be crossed").

[11] A documented design point is the measurement from the central office to the longest loop in the area. AT&T Outside Plant Engineering Handbook (Oct. 1996) at 3-10.

[12] 500 x 2 = 1,000 Distribution; 500 x 1.5 = 750 feeder; 1,000 + 750 = 1,750 terminations.

Q. VERIZON CONTENDS THAT, IN ANOTHER PROCEEDING, YOU CONCEDED THAT, CONSISTENT WITH A FORWARD-LOOKING METHODOLOGY, DISTRIBUTION AREAS MUST BE STRICTLY LIMITED TO 200 TO 600 LIVING UNITS. DO YOU AGREE?

A. No. Verizon mischaracterizes my testimony before the Maryland Public Service Commission.[13] Although I testified that engineering guidelines provide that Distribution Areas are typically sized at 200 to 600 dwelling units, I did not testify nor would I that a Distribution Area consisting of fewer than 200 or more than 600 units somehow reflects inefficient outside plant design. As I noted above, DAs can and do properly consist of fewer than 200 and more than 600 living units.

> Moreover, Verizon's insistence that DAs must be limited to 200 to 600 dwelling units would lead to absurd results. If Verizon's argument is taken to its logical conclusion, Verizon would contend that engineering guidelines *require* an engineer to split an existing DA into two DAs whenever the 601st living unit is planned or established. Such an approach is wholly untenable. Engineering guidelines call for the placement of one SAI per DA. Thus, in this example, two SAIs would be required if two DAs were so created. However, Verizon's own Outside Plant Engineering Guidelines explicitly state that **[BEGIN VERIZON PROPRIETARY]**

[13] *See* Murphy Rebuttal Testimony at 28.

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C. 4-Wire Loops

Q. VERIZON CONTENDS THAT 4-WIRE CIRCUITS WOULD REQUIRE ADDITIONAL PLUG-IN SLOTS OR SHELF SPACE AND SHOULD THEREFORE BE ALLOCATED A HIGHER PROPORTION OF COMMON EQUIPMENT COST THAN A TYPICAL POTS CIRCUIT. HOW DO YOU RESPOND?

A. Verizon's arguments cannot withstand scrutiny. Mr. Murphy contends that, because 4-wire circuits require approximately 2 to 4 times as many plug-in slots than a 2 wire POTS line, the "component common equipment cost allocation per circuit for a 4-wire circuit should be 2 to 4 times higher than a POTS line card."[14] However, the slots, shelf space and cabinet space used by line cards is a *de minimis* part of "common equipment cost." The Channel Bank Assembly (CBA) in which these cards reside is quite inexpensive; for all intents and purposes the common equipment costs are the costs associated with the

[14] Murray Rebuttal Testimony at 42.

Common Control Assembly (CCA). (The Channel Bank Assembly and Common Control Assembly are described in detail in my Direct Testimony).

It makes no sense to apportion that cost based on the space occupied by individual line cards in the Channel Bank Assembly, as Mr. Murphy suggests. The capacity of the Common Control Assembly is not limited by the space occupied by line cards. Indeed, the line cards in the Channel Bank Assembly can never be filled by channel units, because 4 of the 60 slots are always reserved for auxiliary units. Thus, at most, cards for 56 POTS lines could be plugged in. If cards for ISDN lines or alarm telemetry lines were plugged in, far fewer than 56 slots could be occupied because the power of the system would be insufficient to handle that many cards. Thus, for example, Channel Unit Power Loading Limits would restrict the number of channel units in a CBA to 20-MCU cards (alarm/telemetry circuits), 32-BRIU cards (ISDN circuits), or 24-43 REBS2 cards (electronic business set "P-Phones").

Similarly, the Subscriber Bus Interface (SBI) limit may impact the number of cards that can actually occupy the slots of a CBA. Each CBA has a maximum assignable bandwidth capacity used to trunk data to the TSI in the CCA. This bandwidth can be exhausted in various Litespan configurations, thereby leaving CBA slots available, but unusable for service. Additionally, the number of cards that can actually occupy the slots of a CBA can be affected by the cross connection capacity of the Time Slot Interchanger circuitry.Thus, it is power and bandwidth and other similar factors that affect the capacity of the common equipment, not the amount of space occupied in the CBA. Apportioning common equipment costs based on DS-0 equivalents, as the Synthesis Model does, is a

reasonable way to take into account these factors. Apportioning costs based on shelf slots occupied is not.

D. Network Operations Expenses

Q. WOULD FORWARD-LOOKING NETWORK OPERATIONS EXPENSES IN A TELRIC ENVIRONMENT BE SIGNIFICANTLY LOWER THAN THEY ARE CURRENTLY?

A. Yes. Brian Pitkin explained in his Direct Testimony that Verizon's current network operations expenses may be overstated. In addition, in a forward-looking network, Verizon's network operations expenses should be substantially lower than current levels. Thus, for example, in a forward-looking network, routing of interoffice facilities (IOF) would be more efficient which would reduce testing, maintenance and other expenses. My experience in New York leads me to conclude that Verizon often misroutes special services as a result of blockages (congestion) in the IOF network. In one case, for example, a customer ordered a service requiring connection to a nearby central office, but, because of blockage, was connected to that office by way of more than ten other central offices. The length of this loop required additional equipment to be placed on the loop, required far more intricate testing to determine the source of any trouble on the loop, and required additional work at the intermediate central offices. While this may have been an extreme case, the misrouting of special services is relatively common. In in a forward-looking network, in which the interoffice facilities are designed for existing capacity, these sorts of blockages that lead to misrouting would not occur and, therefore, the network operations expense should be reduced.

Another network operations expense that could be reduced in a forward-looking network would be the costs associated with TIRKS, Verizon's OSS for assigning

interoffice facilities. The TIRKS OSS has labored for many years with numerous additions, upgrades and patches. A new replacement system, designed for known demand and services, would be more efficient and result in additional opportunities for network expense reductions.

IV. AT&T/WORLDCOM'S INPUTS ARE APPROPRIATE.

A. DLC Inputs

Q. VERIZON CONTENDS THAT MY RECOMMENDED DIGITAL LOOP CARRIER (DLC) HARDWARE INPUT VALUES ARE UNSUPPORTED, TOO LOW AND NOT CREDIBLE.[15] DO YOU AGREE?

A. No. Verizon's contention that I provided no support for my recommended DLC hardware input values is meritless. As I stated in my Direct Testimony, the line card costs that I propose are not only reasonable, but they may be overstated. Indeed, as demonstrated in my Direct Testimony, the line card costs that I propose *exceed* the line card costs that are referenced in a recent market forecast report prepared by the RHK company.[16] Further, my recommended DLC hardware input values are supported by the following information in my Direct Testimony: (1) a graphic identifying each plug-in circuit card for the Common Control Assembly and Channel Bank Assembly which comprise a Litespan System platform; (2) the costs of DLC hardware; and (3) the

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[15] Murphy Rebuttal Testimony at 110.

[16] Verizon asserts that I have failed to provide any information regarding the research report that I referred to in my Direct Testimony. *See* Murphy Rebuttal Testimony at 110. Verizon is simply wrong. At footnote 11 of my Direct Testimony, I referenced the RHK market forecast report. In addition, in response to Verizon's data requests, I provided Verizon with detailed information so that it could purchase this copyrighted research report if it so desired. *See* AT&T and WorldCom's Responses to Verizon Virginia's Ninth Set of Discovery, VZ-VA 9-14.

recommended input values for individual plug-in circuit cards, sets of cards and hardware in support of the cost recommendation.[17]

Verizon's assertion that my DLC hardware inputs are too low and not "credible"[18] is belied by Verizon's own purchasing contract with Litespan that reveals that the costs for DLC hardware set forth in my Direct Testimony generally *exceed* the actual costs for DLC hardware in Verizon's contract with Litespan. The following chart, that compares the costs for DLC hardware in my Direct Testimony with the costs for such hardware in the Litespan contract, confirms that my DLC hardware costs are quite conservative:

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[17] Riolo Direct Testimony at 24, 26.

[18] *See* Murphy Rebuttal Testimony at 110.

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B. Structure Sharing

Q. MR. MURPHY CLAIMS THAT AT&T/WORLDCOM OFFERED NO SUPPORT FOR THE ADJUSTMENTS TO THE STRUCTURE SHARING DEFAULT VALUES. DO YOU AGREE?

A. No. Mr. Murphy has long recognized that Mr. Pitkin's adjustments to the Synthesis Model's default values for structure sharing (that were made based on my recommendations) are derived from the HAI Model. Indeed, Mr. Murphy concedes as much in his Rebuttal Testimony.[21] Additionally, the Rebuttal Testimony of the AT&T/WorldCom Recurring Cost Panel[22] discusses in more detail why Verizon's analysis of structure sharing is erroneous and how the Synthesis Model takes full advantage of structure sharing opportunities.

Q. MR. MURPHY CLAIMS THAT DOWNWARD ADJUSTMENT IN FEEDER STRUCTURE ENVIRONMENT DUE TO STRUCTURE SHARING IS INAPPROPRIATE. IS HE CORRECT?

A. No. Mr. Murphy appears to concede that aerial facilities offer opportunities for structure sharing between feeder and distribution plant where aerial feeder exists.[23] Mr. Murphy contends, however, that structure sharing between feeder and distribution plant often "is precluded" even when they run over the same route because typically "feeder cable is

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[21] *See* Murphy Rebuttal Testimony (noting that the "input value changes prepared by Mr. Pitkin were taken from the HAI model").

[22] Rebuttal Testimony of AT&T/WorldCom Recurring Cost Panel, August 27, 2001 at 76-78.

[23] Murphy Rebuttal Testimony at 98-99.

placed underground, while distribution cable is mostly aerial or buried."[24] Mr. Murphy's analysis is fundamentally flawed.

In the many instances in which feeder and distribution run along the same route, the feeder and distribution will almost always use the same type of structure. Certainly, in a forward-looking network, they should use the same type of structure. There would be no reason to construct two separate types of structure.

Mr. Murphy's assertion that feeder is typically placed underground is wrong. Outside of dense urban areas where the ground is covered with pavement and buildings, only relatively short distances of underground feeder cables are used. In dense areas, structure generally is not shared between feeder and distribution but the reason is not that they use different types of structure, but rather because they do not generally run along the same route.

The reason that underground feeder is not often used outside of urban areas is that underground conduit is much more expensive per foot of structure than aerial or buried structure, the working conditions associated with underground structure are more hazardous than those relating to aerial or buried placement, and lost production time associated with working underground is greater than that for aerial or buried structure. For those reasons, if given a choice, engineers typically avoid underground structure. Significantly, Verizon's own engineering guidelines expressly state that **[BEGIN VERIZON PROPRIETARY]**

[25] **[END VERIZON PROPRIETARY]**

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[24] *Id.* at 99.

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Furthermore, it is absurd, as Mr. Murphy suggests, that in a forward-looking TELRIC environment, an ILEC would place most of its feeder underground. Structure represents a significantly large portion of the cost associated with cable construction. Feeder cables run from the Central Office to the boundaries of the Wire Center where they terminate in SAIs. The routes in which feeder cable travel are also populated with other utilities -- utilities with the same customer base as that of the ILEC. In a forward-looking environment, the ILEC would seek to maximize the opportunities of structure sharing. As a consequence, in such an environment, the ILEC would not substantially reduce its structure-sharing opportunities by placing its feeder cable underground.

Additionally, since feeder cables run past the very customers they serve, it would not make economic sense for telephone feeder plant to be placed in costly underground conduit and manholes, while the distribution plant -- that serves the very customers passed by the feeder cable -- is placed in other structure types. For all of these reasons, there is no sound basis for Mr. Murphy's assertion that all feeder is or should be placed underground.

Q. MR. MURPHY CLAIMS THAT YOUR OWN TESTIMONY REGARDING STRUCTURE SHARING OPPORTUNITIES IS INTERNALLY INCONSISTENT. DO YOU AGREE?

A. No. Mr. Murphy contends that my recommendation regarding the appropriate level of structure sharing between feeder and distribution is squarely at odds with my purported concession that virtually all "feeder cable is underground, while little underground distribution cable exists."[26] Mr. Murphy mischaracterizes my testimony.

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[26] Murphy Rebuttal Testimony at 99.

Notwithstanding Mr. Murphy's misguided assertion to the contrary, I did not assert in my Direct Testimony that virtually *all* feeder cable is placed underground. In my Direct Testimony I explained that it is reasonable to expect that a greater percentage of underground feeder cable can be found in higher, rather than lower, density zones.[27] The structure associated with feeder cable is frequently dependent upon the environment in which it is placed. Typically, dense urban environments are covered with paved streets, sidewalks and building structures, thereby precluding buried and pole placement. However, in less dense environments, the opportunity to place feeder cable in the buried or aerial environment is much greater.

Q. MR. MURPHY CLAIMS THAT YOU OVERSTATE STRUCTURE SHARING OPPORTUNITIES WITH UTILITIES AND OTHER COMPANIES, IS HE CORRECT?

A. No. Mr. Murphy claims that structure sharing will not be possible in some circumstances due to local ordinances or weather conditions, and that in low density zones, the opportunity for structure sharing will be small. In my experience, however, opportunities for structure sharing are widespread. Even in low density-zones, structure can be shared with utilities and CATV providers. And it is very rare that local ordinances or other factors will prevent sharing. Mr. Murphy provides no examples of this occurring much less evidence that this occurs frequently.

[27] Riolo Direct Testimony at 40.

C. Road Distance Factor

Q. MR. MURPHY CLAIMS THAT THE ROAD DISTANCE FACTOR IN THE SYNTHESIS MODEL SHOULD HAVE BEEN INCREASED. IS HE CORRECT?

A. No. Mr. Murphy asserts that there "when upgrading their feeder network over the past 10 years, or so ILECs have replaced copper cables with fiber facilities and have removed the copper cable because of its salvage value."[28] Mr. Murphy then concludes that "any suggestion that Verizon VA's amount of cable sheath is exaggerated and should be reduced is unrealistic and unfounded." Mr. Murphy is wrong once again.

Despite Mr. Murphy's assertion to the contrary it is generally not ILEC policy to modernize existing plant on a large scale by replacing copper cables with fiber facilities. Instead, when relieving copper feeder, ILECs overlay a fiber/electronics solution over the existing copper network. For example, Southwestern Bell Telephone Company ("SWBT") has publicly stated that it reuses copper feeder cables or leaves them in place. Indeed, SWBT recently testified that its Project Pronto architecture "is an overlay data network [and] does not entirely replace the existing voice network."[29]

Similarly, Verizon's own engineering guidelines state that, **[BEGIN VERIZON PROPRIETARY]**

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[28] Murphy Rebuttal Testimony at 104.

[29] *See* the Rebuttal Testimony of W. Matthew Terrell (SWBT), Case No. TO-2001-439 (June 22, 2002) at 6.

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Furthermore, copper feeder cable, by design, is sized for then current service plus sufficient spare capacity for 3 to 5 years of forecasted growth.[31] Thus, feeder cable is periodically augmented over time. It therefore follows that Verizon's embedded base contains multiple cable sheaths in the routes that were augmented in this fashion in accordance with industry and Verizon's own engineering guidelines. It should also be noted that, because the fiber/copper breakpoint (the economic decision that dictates placing fiber in lieu of copper at a particular distance) occurs at some distance from the CO, there will always be multiple sheaths in routes that have fiber cables. Mr. Murphy is therefore mistaken when he assumes that an increase in the road factor is warranted to adjust the cable sheath miles with its associated structure to reflect the actual route miles that structure and cable follow.

V. THE SYNTHESIS MODEL'S FILL FACTORS ARE APPROPRIATE.

Q. VERIZON CLAIMS THAT THE SYNTHESIS MODEL IS NOT AN APPROPRIATE COSTING TOOL FOR PRICING UNITS BECAUSE IT FAILS TO ADHERE TO STANDARD ENGINEERING GUIDELINES. DO YOU AGREE?

A. No. Verizon's criticism is largely made in the context of its discussion regarding appropriate fill factors. Thus, for example, Mr. Murphy states that "the Synthesis Model ignores accepted planning standards and guidelines for building distribution facilities and

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builds insufficient distribution capacity to serve existing demand efficiently."[32]

Mr. Murphy also claims that the Synthesis Model's utilization factors for copper feeder fail to provide sufficient spare capacity in accordance with engineering standards.[33] However, as Terry Murray pointed out in her separate Rebuttal Testimony, Verizon's approach is fundamentally flawed because Verizon assumes that the amount of spare capacity properly charged to current ratepayers is equivalent to the amount of unused capacity that an engineer would include when designing outside plant (OSP). As Ms. Murray explained in her Rebuttal Testimony, from a costing perspective, the relevant inquiry is not how much unused capacity should be constructed today, but rather how much spare capacity should be built and charged to current ratepayers. As Ms. Murray further explained, in order to answer the latter question, it is necessary to estimate the present value of the future costs of building and operating the capacity over its expected life, and then calculate unit costs based on the net present value over the same expected life. The resulting cost-based prices will not require today's ratepayers to subsidize future customers on whose behalf the spare capacity is being constructed. Ms. Murray addresses this issue further in her concurrently filed surrebuttal testimony.

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[32] Murphy Rebuttal Testimony at 84.

[33] *See, id.*, at 87-89.

Q. ASSUME FOR THE SAKE OF ARGUMENT THAT THE COMMISSION WERE TO USE STANDARD ENGINEERING STANDARDS, RATHER THAN ECONOMIC ANALYSIS, TO DETERMINE THE AMOUNT OF SPARE CAPACITY. DOES VERIZON CALCULATE FILL IN ACCORDANCE WITH STANDARD ENGINEERING GUIDELINES?

A. No. As explained in the Rebuttal Testimony of AT&T/WorldCom Recurring Cost Panel, Verizon's definition of utilization in this proceeding does not comport with generally accepted industry guidelines or Verizon's own engineering guidelines. Moreover, given the rapid pace of technological innovation, Verizon's proposed low fill factors will result in the creation of excess facilities that will be technologically obsolete before they are ever used -- if they are ever used at all.

Q. IS THERE SUFFICIENT SPARE CAPACITY INCORPORATED INTO THE SYNTHESIS MODEL?

A. Yes. The fill factors associated with the various components of Outside Plant create the necessary spare capacity to care for growth and churn. From an engineering perspective, copper feeder cable should be constructed to handle all known demand plus 3 to 5 years of growth. At the Verizon-Virginia average growth rate of 3% annually, 5 years of growth capacity would yield 15% spare **[BEGIN VERIZON PROPRIETARY]**

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The Synthesis Model target fill factors for feeder cable will allow the model to develop more than sufficient spare capacity to meet these demands. As explained in the Surrebuttal Testimony of Mr. Pitkin, the Synthesis Model generates an effective fill factor of 52.5% for distribution plant. From an engineering perspective, the level of spare capacity (the reciprocal of fill) developed by the Synthesis Model is sufficient to handle growth, churn and demand fluctuations.

Q. VERIZON CONTENDS THAT 100 PERCENT UTILIZATION FACTOR FOR FIBER IS UNREALISTIC. IS VERIZON CORRECT?

A. No. For all of the reasons cited in my rebuttal testimony, it is certainly realistic to attain 100% utilization on fiber strands. Moreover, although Verizon contends that a 100 percent utilization factor for fiber is wholly unrealistic, Verizon's assertion is belied by

[BEGIN VERIZON PROPRIETARY]

[END OF VERIZON PROPRIETARY].[35]

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

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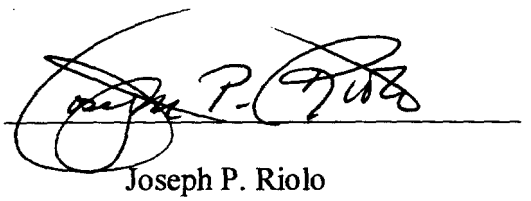
[35] **[BEGIN VERIZON PROPRIETARY]**

[END VERIZON PROPRIETARY].

I, Joseph P. Riolo, hereby certify under penalty of perjury that the foregoing surrebuttal testimony is true and accurate to the best of my knowledge and belief.

September 19, 2001



Joseph P. Riolo